

of the Coal period, the author does not hint at any definite geological fact, save that mosses and *bull-rushes* (query *Equisetaceæ*) became gigantic trees. After upheavals in the Permian period we arrive at the "Age of Monsters," by which the author means the *Ichthyosaurus* and the *Plesiosaurus*, which (after Blake's picture in Hawkins's "Sea Dragons") have a mighty battle, the *Ichthyosaurus* coming off conqueror. We are next introduced to "The Giant Newt" (probably the *Pariasaurus?*), then to the *Atlantosaurus*, moving with his head in the clouds! Pages of grandiloquent poetry, after the pattern of Pope's translation of Homer's *Iliad*, are devoted to an impossible battle between herds of armed herbivorous Dinosaurs and armies of carnivorous ones, the author apparently being unaware that the latter were extremely few in number compared with the former, just as the herbivorous mammals were as a thousand to one carnivore on the African plains before "man the destroyer" came upon the scene with his "shooting-iron."

"And howls of anguish and of beasts dismayed
Strike on the air. In crowded cohort stand
The monsters of the plains, begirt on every hand.
Their roaring foes, less huge, but of a shape
Obscene and foul beyond a parallel,
Rush on to decimate with jaws agape
The remnants thus enclosed. These slowly fell" (p. 58, vv. 40, 41).

In canto the tenth the author gives us "A Day with an *Iguanodon*," and with the late Mr. J. L. Toole we are inclined to exclaim, "oh! what a day we are having."

"In ten enormous strides he fared a mile.
Towering above the tree-tops as he strode
He soon was in his den amid the ferns bestowed" (p. 69, v. 31).

In the eleventh canto we reach the Tertiary period, and have the first glimpse of ape-like man reflecting on the scene from a tree overlooking a pool at which the *Dinotherium*, *Palæotherium*, *Anoplotherium*, *Mastodon*, *Dinoceras*, *Megatherium*, and *Myodon* (as was their habit!) came down to slake their afternoon thirst. The author is so pleased with this idea that he repeats on pp. 76, 77, vv. 32 and 38, and p. 82, v. 15, the same scene.

He goes on (in canto thirteen) to describe "The Earthly Paradise," and on pp. 85, 86, gives an unlovely picture of humanity in its early stage, but on p. 87, vv. 27-34, evolves from the baser herd a superior pair endowed with finer instincts; but on p. 89, v. 35, he admits:—

"Yet were they both but brutish beasts, amid
That garden of delights, that Paradise," &c.

"The male on lank and shaggy shanks upreared,
Whose breast and back unsightly bristles drape,
Whose monstrous snout protuberant appeared,
Whose brutish jaws seemed evermore to gape
With teeth and tusks of dire revolting shape" (p. 89, v. 36).

The flood follows, then cave-dwellers are depicted, and the use made of stones as weapons, of skins as clothing, and the discovery of fire-making, the sling, the spear, bow and arrow, and so on.

The whole material is woven up into a poetic and exaggerated form which, to our way of thinking,

renders it highly unsatisfactory. Kitchen-middens, lake-dwellings, the continent of Atlantis, the capture of the first horse, the potter's art, the origin of ornaments, of music, singing and dancing, are introduced. Then legends are touched upon, the domestication of the dog, the wandering minstrel, and, lastly, a legend of the "Ice age" into which we cannot follow the learned author. Mr. Rowbotham's legendary lore and his talent for verification may be admirable, but his geology and palæozoology are extremely shady, and we do not recommend him as a guide to follow in his reconstructions of the past history of the earth or of prehistoric man.

MATHEMATICS FOR SCHOOLS.

- (1) *Elementary Geometry based on Euclid's Elements*. By F. Purser. Pp. vii+121. (Dublin: Hodges, Figgis and Co., Ltd.; London: Longmans, Green and Co., 1906.)
- (2) *Geometry, Theoretical and Practical*. Part i. By W. P. Workman and A. G. Cracknell. Pp. x+355. (London: University Tutorial Press, Ltd., 1906.) Price 3s. 6d.
- (3) *Elementary Geometry*. Books vi. and vii. By W. M. Baker and A. A. Bourne. Pp. 390-477. (London: G. Bell and Sons, 1906.) Price 1s. 6d.
- (4) *A Shilling Arithmetic*. By S. L. Loney and L. W. Grenville. Pp. 186+xxiv. (London: Macmillan and Co., Ltd., 1906.) Price, with answers, 1s. 6d.
- (5) *Junior Arithmetic with Answers*. By W. G. Borchardt. Pp. viii+221+xl. (London: Rivingtons, 1906.) Price 2s.
- (6) *A Junior Arithmetic*. By C. Pendlebury, assisted by F. E. Robinson. Pp. xii+204. (London: G. Bell and Sons, 1906.) Price 1s. 6d.
- (7) *A Preliminary Course in Differential and Integral Calculus*. By A. H. Angus. Pp. vi+108. (London: Longmans, Green and Co., 1906.) Price 2s. 6d.
- (8) *A College Algebra*. By Prof. H. B. Fine. Pp. viii+595. (London and Boston: Ginn and Co., n.d.) Price 6s. 6d.
- (9) *A New Trigonometry for Beginners*. By R. F. D'Arcy. Pp. viii+84. (London: Methuen and Co., n.d.) Price 2s. 6d.
- (10) *Elementary Descriptive Geometry*. By C. H. McLeod. Pp. ix+118. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1905.) Price 6s. 6d. net.

(1) IN Mr. Purser's "Geometry" the subject-matter corresponds essentially with that of the first six books of Euclid, and the treatment is on similar lines, but the propositions are differently arranged, and are grouped, with the object of showing the reasons for the sequence adopted. Euclid's definitions of parallels and proportion are adhered to, though the defective statement of the former on p. 17 must be due to an oversight. No exercises are provided, and teachers will find little to induce them to adopt the book in their classes.

(2) In the "Geometry" by Messrs. Workman and Cracknell we have a very full treatment of angles,

parallels, triangles, parallelograms, and circles, with areas, loci, and symmetrical figures. There is a short introductory course of experimental geometry, followed by a preliminary chapter on the "science of geometry," in which fundamental concepts, axioms, and deductive processes are discussed. Thus prepared, practical work and logical development proceed together. There are exercises in abundance of all types, theoretical, constructive, and numerical, the answers to the latter being given. There is a useful index of terms, and a collected list of propositions very convenient for reference. The book should prove of great value to teachers and pupils alike, and seems altogether good.

(3) The new volume by Messrs. Baker and Bourne deals with the geometry of three-dimensional space. Book vi. corresponds with Euclid xi., and Book vii. gives the mensuration of the simple geometrical solids. The high standard of the authors' previous work is maintained. The treatment is clear and concise, the printing is excellent, and useful sets of exercises are provided for class work.

(4) The "Shilling Arithmetic" by Messrs. Loney and Grenville is a handy little volume intended more especially for use in secondary schools, and consisting mainly of a very large collection of graduated examples with explanatory notes. Physical as well as commercial arithmetic is represented, though examples of the latter type predominate. Answers are given at the end, and altogether the book is very suitable for its purpose.

(5) Mr. Borchardt's "Junior Arithmetic" is very like the one just noticed, but more use is made of graphs, the commercial type of exercise is less prominent, and the treatment follows more closely the scheme of the committee of the Mathematical Association. A special feature of the book is a set of 385 examples arranged as a graduated set of fifty-five test papers covering the whole subject. The course will form a good preparation for the Oxford and Cambridge locals, the London matriculation, and similar examinations.

(6) The "Junior Arithmetic" by Messrs. Pendlebury and Robinson is very similar in character to the two just mentioned, and is well suited for use under similar conditions. In all three there are too many exercises of the kind "If 120 men can build a house 60 feet high in 15 days, how many men will it take to build one 55 feet high in 10 days?" But the teacher can delete these and still have ample choice. The book can be obtained with or without answers.

(7) Many students rightly wish to acquire an elementary working knowledge of the calculus at a comparatively early stage. By such the preliminary course of Mr. Angus will be appreciated. The author confines himself to the algebraical, trigonometrical, and exponential functions, and has thus space available for ample illustration. There seems to be a want of clearness in the author's notion of a rate; for instance, on p. 27, where in the expression $dV/dD = \pi D^2/2$, relating to a sphere, V denoting volume, he puts dV equal to 7.5 cubic inches per second, a statement which must perplex a thoughtful

student. However, the book is a good one, and can be recommended to beginners who have some knowledge of squared paper work.

(8) The "College Algebra" by Mr. Fine is a very masterly and fascinating treatment of the subject, whether from the standpoint of logical completeness or of practical computation. The book is divided into two parts, the first and smaller of which establishes the fundamental laws of operation for numbers, rational and irrational, imaginary and complex, the discussion being based "on the notion of cardinal number and the notion of order, as exhibited in the first instance in the natural scale 1, 2, 3, . . ." The second and main part of the work deals most thoroughly with the successive developments, and carries the subject so far as to include, in the later portions, the theory and solution of cubic and bi-quadratic equations, determinants, the binomial, exponential, and logarithmic series, the properties of continuous functions, &c. The volume is beautifully printed, and whether adopted or not as a text-book in this country, so excellent a treatise should be found in the library of every teacher of mathematics.

(9) As a first course of trigonometry for beginners the elementary text-book of Mr. D'Arcy is well conceived, the work being closely associated with quantitative practical geometry, and being carried only so far as problems on heights and distances and the solution of triangles, complex trigonometrical transformations being wisely absent. At the same time the idea of the book is not well carried out in detail. The style is unattractive, and the illustrations are not very illuminating. The figures are badly printed, and sometimes are scarcely legible. More attention might well have been given to the solution of triangles by means of right-angled triangles, and it seems a mistake to have omitted to include the four-figure tables in the text. The book is designed for candidates taking the Cambridge previous or the Cambridge general examination, and test papers at the end contain many questions selected from these examination papers.

(10) The "Descriptive Geometry" by Mr. McLeod is intended as a minimum course for engineering students. It deals in a simple and straightforward manner with elementary problems on points, lines, and planes, polyhedra, curved surfaces and tangent planes, including several skew surfaces, sections, envelopes and developments, trimetric projections, and shadows.

PHOTOGRAPHIC TOPICS.

The Complete Photographer. By R. Child Bayley. Pp. xv+410. (London: Methuen and Co, n.d.) Price 10s. 6d. net.

AFTER having read this volume, the question that naturally presents itself to the reviewer is, to what class of readers will it appeal? The author, in his preface, states that he has made no attempt to compete with the many books on photography that have already been published, whether scientific treatises upon the principles underlying the practice or manuals of practical instruction. He states, further,